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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/779,125
Filing Date: February 07, 2001
Appellant(s): SAKAI, MASUMI

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GROUP 2800

Keiichi Nishimura (29,093)
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 28, 2005 (4/28/05) appealing from the Office action mailed August 13, 2004 (8/13/04).

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,159,876	EGAN et al.	7-1979
4,669,040	PETTIT et al.	5-1987
5,104,220	OKUMOTO et al.	4-1992

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 12-13, 15-16 are rejected under 35 U.S.C. 103(a). These rejections are set forth in the prior Office Action dated 8/13/04, and copied *infra*.

Claims 12-13, 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Egan et al. (U.S. Patent No. 4159876), of record, in view of Pettit et al. (U.S. Patent No. 4669040), of record, and Okumoto et al. (U.S. Patent No. 5104220), of record.

Egan et al. discloses a furnace-type atomic absorption spectrophotometer comprising a tube for heating a sample (See 2 in Figure 1; col. 3, lines 27-59), monitoring means for monitoring temperature of the tube (See upper portion of Figure 1, minus the DC-AC Converter and workhead; circuitry around 21, including 12, R_1, and 21 in Figure 5) and outputting a monitored value indicative of the monitored temperature (See 15 in Figure 5), heating control means (See lower portion of Figure 1, including the DC-AC Converter and workhead; Lower portion of Figure 5; Figure 6) for controlling heating current for heating the tube such that the monitored value will approach a specified target temperature value, and parameter setting means (See for example 7, 8, 9, 25, 'Ramp Rate' in Figure 5; col. 4, lines 5-17) for adjusting parameters according to conditions of measurement and thereby controlling indicial response characteristics,

at a time of raising temperature (See for example 7, 8, 9, 25, 'Ramp Rate' in Figure 5; col. 4, lines 5-17), of the heating control means in units of milliseconds (See for example col. 3, lines 40-59; by standard SI conversion, 1 second is equivalent to 1000 milliseconds) when the tube is heated by the heating control means (See col. 3, line 1-col. 6, line 7). Egan et al. additionally discloses the parameter setting means including an input device for allowing a user to input parameters (See 7, 8, 9, 25, 'Ramp Rate' in Figure 5; col. 4, lines 5-40), and an input device for allow a user to input a condition corresponding to the parameters (See 7, 8, 9, 25, 'Ramp Rate' in Figure 5; col. 4, lines 5-40). Egan et al. also discloses that the monitoring means monitors values indicative of the temperature of the tube (See 15 in Figure in Figure 5; col. 4, lines 52-68). Egan et al. lacks the heating control means *digitally* controlling heating current for heating the tube, or the parameter setting means setting parameters that determine response characteristics of the heating control means, the parameter setting means adjusting the parameters according to kinds of elements to be detected. However, Pettit et al. teaches a self-tuning digital PID controller for applications such as plastic extruders and continually operable furnaces and ovens (See col. 1, lines 20-44; col. 13, lines 46-62). In particular, the digital PID controller is able to determine the appropriate PID tuning parameters, which include that standard proportional, integral, and differential parameters (See Abstract; col. 7, lines 12-25), and set the system to utilize these parameters (See col. 7, line 12-col. 8, line 61). Additionally, the self-tuning digital PID controller includes a microprocessor and non-volatile electrically alterable read-only memory (See col. 9, lines 33-55) to digitally process and store the calculated parameters for later use. The combined teachings of Egan et al. and Pettit et al. lack the parameter setting means setting parameters that determine response characteristics of the heating control means, the parameter

setting means adjusting the parameters according to kinds of elements to be detected. However, Okumoto et al. teaches a flameless atomic absorption spectrophotometer apparatus and analyzing method (See for example Abstract). As taught by Okumoto et al., the ashing and atomization temperatures are unique for each specific element. Hence, different heating programs are stored and utilized by the spectrophotometer based on the element or combination of elements to be detected and analyzed (See Figure 1; col. 1, line 6-col. 2, line 4). The heating programs are stored and executed by a central control section (See 52 in Figure 1), with signal instructions being sent directly to the heating power supply (See 54 in Figure 1). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the self-tuning digital PID controller, as taught by Pettit et al. in the furnace-type atomic absorption spectrophotometer as disclosed by Egan et al. One would have been motivated to do this to provide automated control of the determination of characteristic furnace parameters, as well as provide automated and self-tuning functions as the furnace characteristics change over time. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the parameter setting means set parameters that determine response characteristics of the heating control means, the parameter setting means adjusting the parameters according to kinds of elements to be detected, as taught by Okumoto et al., in the spectrophotometer of Egan et al. in view of Pettit et al. One would have been motivated to do this to maximize atomization of the element to be analyzed and detected, thus increasing the sensitivity and signal-to-noise ratio of the measurement system.

(10) Response to Argument

The Appellant's arguments and remarks filed 4/28/05 in response to the final rejection, dated 8/13/04, have been fully considered, however they are not found persuasive.

It is the Appellant's belief that the combined teachings of Egan et al., Pettit et al., and Okumoto et al. fail to teach or reasonably suggest a furnace-type atomic absorption spectrophotometer, including parameter setting means for setting parameters that determine response characteristics of said heating control means, said parameter setting means adjusting said parameters according to kinds of elements to be detected and thereby *controlling indicial response characteristics of said heating control means in units of milliseconds* when said tube is heated by said heating control means (Emphasis added), as generally recited in Claim 12. More specifically, the Appellant argues that none of the cited references describe or at least hints at such parameter setting means having the particular function of controlling indicial response characteristics of the heating control means in units of milliseconds (See Page 4 of Appellant's Appeal Brief dated 4/28/05). However, it is the belief of the Examiner that the combined teachings of Egan et al., Pettit et al., and Okumoto et al. (particularly the teachings of Egan et al.) do disclose controlling indicial response characteristics of said heating control means in units of milliseconds.

As previously stated in Section 6 of the Office Action dated 8/13/04, Egan et al. is drawn to a furnace-type atomic spectrophotometer system (See specifically Figure 1). In particular, Egan et al. discloses that the furnace-type spectrophotometer system includes a tube for heating a sample (See 2 in Figure 1; col. 3, lines 27-59 of Egan et al.); monitoring means for monitoring temperature of the tube (See upper circuitry portion between Vi and Vo of Figure 1, minus the

DC-AC Converter and workhead; circuitry around 21, including 12, R_1, and 21 in Figure 5 of Egan et al., wherein an accurate measure of the voltage applied to the workhead is directly proportional to the workhead temperature (See Figure 2 of Egan et al.)) and outputting a monitored value indicative of the monitored temperature (See 15 in Figure 5 of Egan et al., wherein the monitored voltage applied to the workhead is converted to temperature and displayed on the meter); and heating control means (See lower portion of Figure 1, including the DC-AC Converter and workhead; Lower circuitry portion of Figure 5; Figure 6 of Egan et al.) for controlling heating current for heating the tube such that the monitored value will approach a specified target temperature value. In addition, Egan et al. discloses particular parameter setting means (See for example 7, 8, 9, 25, 'Ramp Rate' in Figure 5; col. 4, lines 5-17 of Egan et al., wherein the parameter setting means is in the form of, at the very least, potentiometers to adjust a compensating time constant based on whether 'dry', 'ash', or 'atomise' temperatures are required at the workhead) for adjusting parameters according to conditions of measurement. Further, as discussed by Egan et al. in col. 3, line 27-col. 4, line 40, various electrical components, particularly resistor R1 and capacitor C1 of Figure 1, or the various potentiometers 7, 8, 9, 25, 'Ramp Rate' in Figure 5, may be made adjustable so that the time constant introduced by these adjustable components may be made to closely match that of the temperature-time constant of the workhead (See specifically col. 3, lines 27-59; Figures 2-3 of Egan et al.). By matching these two time constants, the temperature of the workhead may be made to closely track the applied voltage Vo to the workhead, thus allowing for very accurate measurement and read-out of the workhead temperature. Therefore, Egan et al. does also disclose that adjustment of the parameter setting means (i.e. the various potentiometers) thereby controls an indicial response

characteristic (i.e. a compensating time constant of the circuitry driving the workhead based on the particular 'dry', 'ash', or 'atomise' temperature required) when the tube is heated by the heating control means.

The Examiner further notes that, as previously stated in Section 6 of the Office Action dated 8/13/04, Egan et al. discloses the temperature-time constant for the workhead to be in the range of approximately one to five seconds for a conventional spectrophotometer carbon-rod atomizer (See col. 3, lines 45-49 of Egan et al.). Hence, to have the applied voltage Vo to the workhead accurately track the temperature of the workhead, the compensating time constant (i.e. an indicial response characteristic of the heating control means) is made to closely match that of the temperature-time constant for the workhead (Again, see col. 3, lines 27-66 of Egan et al.), and thus the compensating time constant (i.e. an indicial response characteristic of the heating control means) will also be in the range of one to five seconds. Specifically, the indicial response characteristic of the heating control means, as recited in Claim 12 (specifically lines 8-11), is stated as follows:

> "...and thereby controlling indicial response characteristics of said heating control means in **<u>units</u> of milliseconds** when said tube is heated by said heating control means;...". (Emphasis added)

This response characteristic only requires *units of milliseconds, and not to actually have a response characteristic that occurs or is adjustable on the order of millisecond timeframe.* One of ordinary skill would have known that the one to five second compensating time constant is equivalently 1000 to 5000 milliseconds, based on standard SI convention where 1 second is

equivalent to 1000 milliseconds. Thus, one skilled in the art would recognize that the heating control means may operate in and display units of milliseconds, instead of seconds.

Appellant appears to have attributed a much narrower interpretation of the recited limitation of the parameter setting means thereby controlling indicial response characteristics of said heating control means in units of milliseconds (See in particular Pages 3-4 of Appellant's specification, wherein the response characteristic occurs or is adjustable on the order of millisecond timeframe). However, it is noted that such features upon which Appellant relies are not explicitly recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Further, it is believed that the Examiner has reasonably interpreted the limitation of the parameter setting means thereby controlling indicial response characteristics of said heating control means in units of milliseconds to mean that the indicial response characteristic is only required to be in units of milliseconds, such that the heating control means may operate in and display units of milliseconds, as opposed to the units of seconds as disclosed by Egan et al.

With regard to the remaining dependent Claims 13, 15, and 16, since Appellant's only argument is that these are allowable based on their dependency on Claim 12, then the aforementioned rejection of these claims stand since Claim 12 remains rejected.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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3/30/06

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